REMARKS

Claims 1, 3-8, and 10-33 are pending in the application. Claims 1, 10, 12, 22 and 29-31 have been amended, and claims 2, 6, and 9 have been canceled. No new matter has been introduced by the amendment.

Claim Objections

Claims 1, 9, 12, and 22 have been rejected for including inadvertent errors. This objection is overcome in view of the amendment of these claims to address the informalities identified in the instant Office Action.

Claim 1 has been amended to include a ";" following the phrase "the source substrate."

Claim 9 has been canceled in view of the inclusion of its subject matter in amended claim 1.

Claim 12 has been amended to change the word "apply" to "applying."

Claim 22 has been amended to delete the second instance of the term "second species."

Rejection Under 35 USC §112, second paragraph

Claims 29-31 have been rejected for erroneously stating "a pulse of energy." This rejection is overcome in view of the amendment of claim 29 in which "a pulse of energy" has been replaced by "the heat treatment." Further, claims 30 and 31 have been amended to change their dependency from claim 29 to claim 1.

Rejection Under 35 USC 102(b)

Claims 1, 7-8, 17-19, 24-27, and 32-33 have been rejected over Aspar et al. (US Pat. Publication No. 2003-0077885). This rejection is overcome in view of the amendment of claim 1, together with the following remarks.

Claim 1, as amended, recites a method that includes implanting at least a first species of ions or gas at a first dose in a source substrate. A stiffener is applied in

contact with the source substrate, and a heat treatment is applied to the source substrate. The heat treatment creates a buried weakened zone that includes crystalline defects. The crystalline defects comprised about 20% to 35% of a total surface area of the source substrate. Claim 1 further specifies applying a pulse of energy to only a portion of the buried weakened zone in the source substrate so as to provoke a self-supported splitting of the thin film. The splitting of the thin film is carried out in the absence of any additional splitting force. The applicants assert that claim 1 distinguishes over Aspar et al.

As set forth in the applicants' specification, a "self-supported splitting" means complete and virtually instantaneous splitting. The self-supported splitting takes place through the precise work of shaping the fragile area. (Substitute specification, 0031). As further described by the applicants, a self-supported propagation of a fracture wave means that it is not necessary to assist the propagation of the wave by advancing a tool or repeating the initiation energy pulse. (Substitute Specification, paragraph 0033). The self-supported fracture can occur where defects are created in the substrate, such that the area opened up by the defects ranges from about 25% to about 32% of the total area of the wafer. (Substitute Specification, paragraph 0034). Accordingly, upon application of a pulse of energy to only a portion of the buried weakened zone, a self-supported splitting of the thin film takes place in the absence of any additional splitting force.

In contrast to the applicants' claimed method, Aspar et al. disclose a method in which gaseous species are evacuated from the weakened zone. The process can further include an over-weakening step in which further gaseous species are introduced alone or in combination. The purpose of the over-weakening step is to facilitate effectively separating the thin layer from the remaining part of the substrate. (Aspar et al., paragraph 0045). Despite the over-weakening step, the process disclosed by Aspar et al. still requires some type of assistance to achieve separation of the thin film. The assistance is provided by either additional steps to over-weakening the substrate, or applying a heat treatment or mechanical stress, or both. (Aspar et al., paragraph 0045). The applicants assert that their claimed process distinguishes over Aspar et al. at least

because the recited method operates to achieve self-supported splitting. The self-supported splitting is realized by their claimed method in which about 20% to about 35% of the total surface area of the source substrate comprises crystalline defects.

Claim 7 depends from claim 1 and further specifies that the pulse of energy comprises applying pulse at no more than about 300°C. And, claim 8 recites that the pulses can be applied at room temperature. While Aspar et al. disclose that separation may be by means of applied pulses, Aspar et al. do not suggest or disclose any temperature limitations with respect to the application of pulses. Further, the applicants assert that claim 7 distinguishes over Aspar et al. at least in view of its dependence from claim 1. The applicants disagree with the Examiner's interpretation of Aspar et al as suggesting room temperature application of pulses. (Office Action, page 4). The applicants assert that Aspar et al. is silent as to any temperature requirements associated with the disclosed application of pulses.

Claims 17-19 depend directly or indirectly from claim 1. These claims are allowable at least in view of the amendment and remarks pertaining to claim 1.

Claims 24-27 and 32-33 depend directly or indirectly from claim 1. These claims are allowable at least in view of the amendment and remarks pertaining to claim 1.

Claims 1, 12, 15-16, 20-21, 24, and 28 have been rejected over Moriceau et al. this rejection is overcome in view of the amendment of claim 1, together with the following remarks.

Claim 1, as amended, distinguishes over Moriceau et al. at least because Moriceau et al. fail to suggest or disclose forming a buried weakened zone including crystalline defects comprising about 20% to about 30% of the total surface area of the source substrate. Further, Moriceau et al. fail to suggest or disclose the application of an energy pulse, as recited by claim 1.

The applicants disagree with the Examiner's characterization of Moriceau et al. as disclosing application of a pulse of energy to the source substrate. (Office Action, page 5). Instead, Moriceau et al. disclose application of a heat treatment that is sufficient to cause fracture of the substrate. Further, Moriceau et al. appear to disclose the global application of a heat treatment without regard to the specific location to which

the heat treatment directed. In contrast, the applicants claim applying a pulse of energy to only a portion of the buried weakened zone. Accordingly, these claims are allowable at least in view of the amendment and foregoing remarks pertaining to claim 1.

Claims 12, 15-16, 20-21, 24, and 28 depend directly or indirectly from claim 1. These claims are allowable at least in view of their direct or indirect dependence from claim 1.

Rejection Under 35 USC §103 (a)

Claims 2-5 have been rejected over Aspar et al. in view of Shaheen et al. (U. S. Pat. No. 7,052,978).

The rejection of claim 2 is now moot in view of the cancellation of this claim. Further, claims 3-5 have been amended to change their dependence to claim 1 in view of the cancellation of claim 1.

The applicants foregoing remarks pertaining to claim 1 and Aspar et al are incorporated herein. The applicants assert that the addition of Shaheen et al. does not overcome the deficiency of Aspar et al. Neither of these references suggests or discloses forming a buried weakened zone including crystalline defects comprising about 20% to about 35% of a total surface area of the source substrate. Further, neither reference suggests or discloses provoking a self-supported splitting by applying energy to only a portion of the buried weakened zone and in the absence of any additional splitting force. Accordingly, claims 3-5 are allowable at least in view of their dependence from claim 1.

Claim 6 has been rejected over Aspar et al. in view of Henley (U.S. Pat. No. 6,146,979). This rejection is now moot in view of the cancellation of this claim.

Claims 9-11 and 29-31 have been rejected over Aspar et al. The applicants' foregoing remarks are incorporated herein. These claims are allowable at least in view of their direct or indirect dependence from claim 1.

The applicants have canceled claim 9 in view of the incorporation of its subject matter into amended claim 1. The applicants disagree with the Examiner's statement that one of ordinary skill in the art would have modified Aspar et al. as a matter of

discovering an optimum value. The applicants' claimed method succeeds in providing a self-supported splitting process through the combination of creating crystalline defects of a specified relative area in combination with applying a pulse of energy to only a portion of the buried weakened zone. This process results in the self-supported splitting of the thin film in the absence of any additional splitting force.

Claims 10-11 and 29-31 are allowable at least in view of their direct or indirect dependence from claim one. Specifically, these claims are directed to the precise formation of crystalline defects that enable the recited self-supported splitting.

Claim 13 has been rejected over Moriceau et al. in view of Sakaguchi et al. (U.S. Pat. No. 5,966,620). This rejection is overcome in view of the amendment of claim 1 together following remarks.

Claim 13 depends from claim 12 and recites that the target substrate comprises an amorphous material. This claim is allowable at least in view of the amendment of claim 1 and the applicants' foregoing remarks pertaining to Moriceau et al. The applicants assert that the cited combination of references does not suggest or disclose the applicants' self-supported splitting process recited by claim 1.

Claim 14 has been rejected over Moriceau et al. in view of Aspar et al. (US Pat. No. 6,103,597). This rejection is overcome at least in view of the amendment of claim1. Neither reference suggests or discloses the method now recited by amended claim 1.

Claims 20 and 22-23 have been rejected over Aspar et al. in view of Cayrefourcq et al. (U.S. Pat. Pub. No. 2004-0171232). This rejection is overcome in view of the amendment of claim1, together with the following remarks.

The applicants assert that neither of the cited references suggests or discloses the applicants' method recited by amended claim 1. Accordingly, these claims distinguish over the cited combination of references.

Statement

The applicants note that Cayrefourcq et al. is owned by the same assignee as the instant application. Accordingly, the applicants assert that Cayrefourcq et al. is not prior art according to 35 USC §103 (c)(1). The applicants assert that both the instant

application and Cayrefourcq et al. were owned by the same person or subject to obligation assignment to the same person at the time the instant invention was made.

The applicants have made a novel and non-obvious contribution to the art of thin film fabrication. The claims at issue distinguish over the cited references and are in condition for allowance. Accordingly, such allowance is now earnestly requested.

Respectfully submitted,

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